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The Increasing Number of Plant-pests.

A CORRESPONDENT who writes to us concerning the work of the experiment stations, speaks in terms of mild censure and considerable regret over the fact that he finds so little in the station bulletins except accounts of insects and fungi, how they live and how they can be killed. He asks whether the gardens and grounds of the stations are much more than hospitals for sick and wounded vegetation, and expresses the opinion that they would be more generally useful if they would give some information and instruction as to the proper treatment of healthy plants which are not preyed upon by bugs or worms. This is a criticism which we consider entirely without foundation. It is not true that the stations neglect investigations relating to plain cultural matters. As a matter of fact, they are now giving more thorough study to soils, to fertilizers, to plant physiology and to practical details of cultivation than they ever gave before. Why these matters seem to be neglected is that much more attention is paid to the diseases of plants and their destruction by insects than was formerly the case, so that the other work seems small in comparison. The same tendency is observed at the meetings of every horticultural society or farmers' institute, and it means, in the first place, that we have only recently learned to locate the causes of many horticultural failures. So long as the Apple-scab, Potato-rot and a good many other plant diseases were considered as the results of the weather, and therefore beyond control, there was no need to study the habits of the fungi which caused them, and so long as insects seemed visitations of God that it was useless to struggle against, there was no need of studying the life-histories of these pests. Now that we have learned to attribute our failures to special causes, it is very evident that a study of these causes is of the highest and most immediate practical advantage.

Besides this we must face another fact, which at first seems most discouraging, which is, that the enemies of our cultivated plants in this country have rapidly multiplied within recent years. No new insects have been created, but new feeding-grounds and new breeding-grounds have helped them to increase to formidable numbers. Upon this point Dr. Lintner has well stated the case when he explained that two hundred years ago, when there was not even a Wild Crab in central New York, there were no Apple insects. When a few Apple-trees were planted by the early settlers and offered desirable food, the insects were compelled to fly for miles to find a tree where they might lay their eggs; but now, when there are orchards which spread almost unbroken masses of foliage over hundreds of acres, Apple insects by the score find root, trunk, twig, bud, leaf, blossom and fruit spread out before them like a banquet to stimulate appetite and hasten on their destructive growth. Besides this, fruit and vegetables and cultivated plants of every sort vary into widely different forms, and in this way invite attacks of different kinds of insects. It is not only that the cultivated plants furnish more and richer food, but they furnish a greater variety of food, to sustain a greater variety of insect life. The destruction of the wild plants upon which the enemy originally subsisted in small numbers may have discouraged them for a time, but it also drives them to seek cultivated plants, and they soon adapt their tastes to what they find ready. With new food supplies prepared for them they can live with less conflict with other tribes once their competitors, who also find fresh fields to conquer, and so both classes are left to multiply unchecked. Besides this aid given to our native insects, many have emigrated here from other lands, and leaving behind them the parasites which have kept them within bounds at home, they begin their destructive work without these natural checks which are only developed after long years in their original surroundings.

The same conditions have helped to multiply contagious diseases. The black-knot fungus of our Wild Plum trees has found orchards planted to make a pleasant home for it. Apple-scab and leaf-blight, Grape-rot and mildew sweep like fire through the almost endless stretch of contiguous orchards and vineyards. Improved varieties of the Tomato invite a rot which those nearer to the wild type rarely harbor. There are new varieties of Apples which are peculiarly affected by scab and blight, new varieties of Blackberries and Raspberries which are special favorites of the rust; and as the different forms of Carnations multiply, many of them are susceptible to diseases which once were almost unknown. Every time we disturb the natural order of things to produce something new in cultivation and better for our use, we open new fields of enterprise for insect life, and offer additional hospitality to parasitic fungi, where both can live with less struggle and find greater advantages for their development.

Looking at these facts calmly one can hardly feel that any precautions against the assaults of these ever-increasing foes can be too great. It has been stated, on what seems good authority, that the destruction of agricultural products in this country by insects and fungous diseases amounts to $500,000,000 a year. Whether the loss of a million and a half dollars a day is a little too large an estimate, or not quite large enough, certain it is that the amount is bewildering and altogether beyond the grasp of the ordinary imagination. Instead of depreciating efforts to arrest this destruction, those who are giving studious attention to the discovery of ways and means for warding off these attacks or mitigating their violence deserve only commendation and sympathetic support. As a matter of fact, the most marked improvement in agriculture and horticulture during recent years has been in this very direction. The rapid changes in the physical features of this country, owing to its recent settlement, have made our cultivated plants more liable to attacks than they are in older countries where the conditions are more stable, but fortunately these greater trials have stimulated us to more earnest and honest effort, so that we are now in advance of all other nations in the variety and efficacy of our devices for protection against our enemies. Indeed, the spraying-pump marks an epoch in the history of horticultural practice. Not long ago

fruit-growers were threatening to grub up their vines and cut down their orchards, but to-day we are growing more fruit, handsomer fruit and better fruit than any other country in the world.

Horticulture at the Midwinter Fair at San Francisco.

WHEN the California Midwinter Fair was first suggested the horticulturists of the state recognized the fact that a very dry winter would prevent a good display, and a very cold, wet winter would discourage visitors. Fortunately, the season, so far, has been favorable, though a little late, and it is now probable that all who come to California this spring to study the horticultural possibilities of the state will be able to see things about as they average.

I am writing these notes at a western window of a farmhouse. It has been raining for two days. The total rainfall for the season is thirteen inches, and we confidently look for three or four inches more by the first of May. The last seven weeks have brought the district about three-fourths of the probable annual rainfall, and most of this has fallen at night. It is warm, growing weather, and our coldest nights are past. I look out on green grass, tall enough for the cattle to eat, on Daffodils in bloom (the paper-white Narcissi are mostly gone), on Camellias, and the large flowers of Magnolia Soulangea. I do not see many roses just now, for the wet weather has spoiled such as opened, but the bushes are full of small buds. Ripe Japanese persimmons are hanging on the trees in one direction, while in another are rows of heavily laden Orange and Lemon trees. This is California, January 22d, some thirty miles from San Francisco.

Now, if I were to advise those who expect to come to California to see the Midwinter Fair from a horticultural standpoint, I should certainly say that the citrus displays will be at their finest early in February. The northern and central counties of the state have already opened their exhibits, and the southern counties will be in line by the time this is printed. These displays include much more than the citrus fruits; one will see a large range of other fruits and vegetables from the extremes of the state and the five hundred miles between. Nevertheless, no one thinks of much besides the brilliant array of oranges, lemons, shaddocks, pomelos and other citrus fruits, in more than a hundred distinct varieties, and many species. Importers from Japan have not only the seedless Satsuma, or Unshin Orange-bearing trees in pots, but also the Kino-Kuni, a seedless hybrid from China, the Kunembo, and the round and oval Kinkan, or "Gooseberry Orange." The oval-fruited has long been popular in California gardens, with its spicy fruit the size of a Primordian plum; the round-fruited is more rare and higher priced. Citrus trifoliata is now so cheaply and easily grown, as a stock for these interesting small oranges, of which an ornamental hedge can be made, that I am not surprised to note an increasing interest in all the Asiatic citrus fruits.

As the citrus display begins to languish, the Midwinter Fair will have a department of California wild flowers, admirably arranged and conducted, representing every part of the state, and thus, to some extent, varied seasons at different altitudes and with diverse exposures. The late slopes of Sierra cañons will make June days seem like April in the valleys. Not before the last of March, or even the middle of April, will the real wealth of the cultivated gardens of the region about San Francisco Bay reveal itself. So much depends upon the season, that I shall not attempt to fix the height of the Rose season further than to advise visitors to remember the closing days of April and the first days of May. It all depends on the district. Roses at San José are a fortnight earlier than at Oakland and Berkeley. The gardens within fifty miles of San Francisco can easily make the Fair notable for its Roses, day after day, for six or seven weeks.

Niles, Calif. *Charles H. Shinn.*

Notes for Mushroom-eaters.—III.

GILL-BEARING FUNGI.

WE may now pass to the consideration of some of our principal edible and poisonous forms. The gill-bearing fungi, Agaricineæ, are divided by botanists into different groups, characterized by the color of the spores, namely: the white, the pink or salmon colored, the brown and the purple or black-spored groups. The Mushroom of commerce (Fig. 7), far more frequently eaten than any other species, naturally deserves notice in the first place. This species,

Fig. 7.—Agaricus campestris (the true Mushroom)—life-size.

Agaricus campestris, sometimes called Pratella campestris, belongs to the group with purple spores. It is often common in grassy places, as lawns and pastures, especially near the sea-shore, but seldom grows in the woods. It even grows in cities, and in Boston it appears in midsummer in the Public Garden and other squares. It may be recognized by the following marks: its color is white, usually with a shade of brown. The pileus is smooth, or, at the most, with insignificant scales. The stipe is solid, and near the upper part is a small ring, easily seen when fresh, but soon shriveling up. The gills, which should always be examined without fail, are, when very young, white, but they change at once to pinkish, and, when mature, to brownish-purple. The spores are purple, with a shade of brown. The general shape of the pileus is flat-convex.

Since cases of poisoning most frequently occur in consequence of mistaking some other species for Agaricus campestris, it is well to bear clearly in mind the principal marks which distinguish the species, namely: the change of color of the gills from pinkish to purple-brown, the purple spores, the solid stipe with a fixed ring near the top. The most nearly related species is the Horse-mushroom, Agaricus arvensis, which differs from the former in being larger and usually more shining white, having gills which retain the original white color for a longer time, and then passing into a brownish-purple without the pink stage, and in having the stipe somewhat hollow when old. The most important botanical distinction is in the fact that in the Horse-mushroom the ring is not a single, but a double membrane, the outer being shorter and star-shaped and adhering closely to the inner. When in good condition the double ring is easily seen, but it often happens that the two membranes are not easily made out. There is no practical danger, however, since the Horse-mushroom is

also edible and about as good as the true mushroom, and, in fact, mushroom collectors, who select the largest mushrooms, not unfrequently gather the Horse-mushroom, and cannot tell it from the true mushroom.

The mistake that mushroom-gatherers make is that they select species which resemble the true mushroom in shape and the color of the pileus only, but neglect to look at the gills to see what their color is and the color of the spores, or whether there is a ring round the stipe, points far more important than the shape and color of the pileus. It is not very likely that one will find in the north-eastern states a poisonous species with purple spores which resembles so much the true mushroom as to be mistaken for it, but there are several species with white gills and white spores which have been mistaken for the true mushroom by careless persons. Of the white-gilled, white-spored species, several are very common and very poisonous, the most poisonous being Agaricus phalloides, Ag. vernus and Ag. virosus. Without attempting to give the minute characters by which botanists distinguish these three species from one another, it will suffice to say that all three are found in woods, Ag. phalloides (Fig. 8) being common, and they occasionally appear on the borders of lawns and pastures. They are generally shining white, but sometimes of a pale yellow color, and are as large as large mushrooms, with taller stipes and comparatively thinner pilei. They can immediately be distinguished from true mushrooms by their very white unchangeable gills. The stipes are at first solid, but soon become either entirely hollow, or there is a central soft and flocculent pith. They all have well-marked rings, decidedly larger than in the mushroom, and the base of the stipe is surrounded by a bag-like envelope, the volva (Fig. 8). This last character is very important and should not be overlooked. In A. phalloides, probably the most dangerous of all our fungi, the volva might be overlooked if one broke off the stipe above the ground, for it extends down to some little distance below the surface of the ground, and the volva may be buried as much as two inches under dead leaves in the soil, so that if the fungus is pulled up roughly the volva may be left behind. The species just named differs also from the true mushroom in the fact that when wet the surface of the pileus is viscid.

Fig. 8.—Agaricus phalloides (two-thirds natural size)—poisonous. *V.* Volva.

Nearly related to the white-spored species named above is Ag. muscarius, one of our commonest and most striking species. It abounds in woods, especially Pine-woods, and in pastures near woods, and is recognized by its brilliant red or yellow colored nearly flat pileus, which becomes much paler when old, over which are scattered, loosely attached, flocculent scales of a white or buff color. The gills, spores and stipe are pure white, and there is a large ring, but the volva, in this case, is not a membraneous sac, but appears in the form of coarse scales attached to the bulbous base of the stipe. The species is poisonous, but not so much so as Ag. phalloides. Its bright color attracts small children of the age when green apples are considered a dainty, and they sometimes attempt to eat it. It has been claimed that this fungus is poisonous to the touch, but this is not true, nor is there any proof that persons have been poisoned by being in rooms where there are specimens of this species. The writer has frequently slept in rooms where the fungus was kept for the purpose of killing the flies which feed upon it, without being in the least affected.

To recapitulate. Unless one has had considerable experience he should avoid eating all those gill-bearing fungi which have white gills and white spores, and a volva of any kind at the base of the stipe. The royal agaric, Ag. cæsareus, which is much esteemed in some places, is not common in the north, where it is seldom eaten, although more abundant in the south. It closely resembles the poisonous Ag. muscarius in many respects, but the gills and stipe are yellow, not white, as in the last named, although, in both cases, the spores are white. It should also be borne in mind that the poisonous species with a volva prefer the woods, whereas the true mushroom prefers the fields.

Harvard College. *W. G. Farlow.*

Foreign Correspondence.

London Letter.

SPRING has begun with us early again this year. Already, the first harbingers, the Christmas Roses, Snowdrops, Crocuses, Eranthis hyemalis and several species of Hellebore are in flower on our lawns and in the rock-garden. The Christmas Roses are a beautiful picture, covering a large space under the trees, in what is called the Wild garden, with crowded tufts of glistening white flowers. We have yet to realize the full value of this plant for producing broad effects in the outdoor garden. Last autumn many thousands of bulbs of Elwes' Snowdrop were dibbled into the lawns, and the charm of their myriads of nodding white bells on the green grass in the middle of January is as delightful as it is easy of production. I gathered the first Crocus—it was a blue C. Imperati—out-of-doors on the 16th instant. The cushion-like tufts of marbled leaves of the European Cyclamen are another charming picture at this time of year. This is another plant which may be relied upon to make a pretty garden-effect that will please, both of marbled foliage and rose-purple flowers. Here they are planted in large numbers among hardy Ferns on a piece of ground which is so shaded by

large Elms that grass would not grow there, but by planting it with the Ferns and Cyclamen it has become an interesting plot at all seasons. Trees and shrubs are being quickened into growth by the exceptionally mild sunny weather of the last week or so, and such early-flowering plants as the Hamamelis arborea, Daphne Mezereum, Lonicera Standishii, Rhododendron Nobleanum and Nuttalia cerasiformis already are clothed with flowers that are precious at this season. The several varieties of Iris stylosa have not been out of flower since the end of November.

Willows with bright-colored bark are a charming feature in the winter shrubbery here. Two varieties of Salix vitellina are particularly attractive at Kew. They are planted on the edge of an island in the middle of the lake, and the rich yellow color of the one and bright crimson of the other are most effective even from a long distance. I remember noting some years ago the red-barked Willow in winter in Birkenhead Park, where it is represented by large clumps about the ornamental water. The uses to which these plants may be put in garden-making are obvious. They are, at least, as attractive in winter as the Siberian Cornus, and they will grow in almost any situation. The best of them are S. vitellina, the golden-yellow Willow; S. vitellina, var. Britzensis, the blood-red Willow; S. vitellina, var. rubra, the Cardinal Willow, and S. vitellina purpurea.

Strobilanthes Dyerianus.—This plant has disappointed some cultivators because of its having lost the brilliant purplish hue of its leaves, which was very attractive on the young plants in summer, but which has changed to a dull gray-purple in winter. I believe it will only prove satisfactory as a foliage-plant when kept soft and growing. There are at Kew old plants which have lost all attraction, whereas young plants from autumn-struck cuttings are bright enough in color. I stated last year that this species would probably prove useful as a flowering plant in addition to its ornateness of leaf. It has lately flowered in the Cambridge Botanic Garden, producing simple axillary racemes about three inches long, clothed with green-tipped, white hairy bracts and tubular blue flowers. I saw a plant of it in flower at the St. Albans Nursery last spring with a terminal raceme only, and this was about nine inches long.

Dracæna thalioides.—This is an interesting species of Dracæna which was found by Gustav Mann when collecting for Kew on the west coast of tropical Africa about forty years ago, and was soon afterward introduced into the Belgian gardens. A figure of it was published by Morren in the *Belgique Horticole*, in 1860. It also bore the name of D. Aubryana. Plants of it are in cultivation at Kew, where it forms a healthy specimen a yard high and flowers annually. It is remarkable for its Thalia-like foliage, the leaves being glaucous green, semi-erect, over two feet long, the lower half narrow and petiole-like, the upper half lanceolate, two and a half inches wide at the base, narrowing upward to an acute point. The flowers, which are white, very narrow, and two inches long, are borne in crowded fascicles on an erect spike two feet long, and they open in batches. It is a striking plant, both when in flower and as a foliage-plant. It suckers freely.

African Aloes.—A considerable number of species of Aloë are worth a place among conservatory and greenhouse plants which flower in winter. They are not grown in gardens now for no other reason, I believe, than because their beauty is unknown. In several of the Kew houses they have been an attraction for some weeks, their tall, often-branched spikes, clothed with tubular orange-red or crimson and yellow flowers, being as beautiful as anything to be seen at this time of year. Tall specimens, with stems from six to ten feet high, and others only a foot or so in height, bearing a crown of succulent green or mottled leaves, from the centre of which rises a spike of flowers suggestive of Kniphofias, or a glorified Lachenalia, are worth a place in any conservatory. The best of those in flower now are A. arborescens, A. supralævis, A. Succotrina, A. Greenii, A. Lynchii, A. pluridens, A. tricolor, A. chloroleuca and A. platylepis.

Freesia refracta alba.—This is a most useful winter-flowering plant for the conservatory, but it has not yet found general favor with cultivators here, as it seems to have done in America. A group of about fifty plants was shown this week from a garden near London; they were about two feet high, the spikes stiff, erect, well branched, and crowded with flowers which were good in substance, large, pure white, and, of course, deliciously scented. At Kew we grow a great number of pots of this plant for the conservatory, and they have been a delightful feature for the past month. Mixed with Poinsettias or Centropogon Lucyanus, they are all the more telling in effect. Although introduced from the Cape many years ago, it is only within the last twelve years that Freesias have attracted the attention of cultivators here, and it is chiefly owing to the efforts of Professor Michael Foster that their charm and usefulness have become known.

New Hybrid Orchids.—Phaio-Calanthe Arnoldiæ is a new hybrid between Phajus grandifolius and Calanthe Regnierii, which was shown in flower by Messrs. F. Sander & Co. It has large, handsome yellow-brown flowers, partaking more of the Phajus than the Calanthe. It obtained an award of merit. Dendrobium Hebe and D. Dido were shown by Sir Trevor Lawrence, in whose garden they had been raised from a cross between D. Findlayanum and D. Ainsworthii. Cypripedium Morganæ, var. Langleyense, is a new hybrid raised by Messrs. J. Veitch & Sons in their Langley nurseries. It is interesting on account of its being the first hybrid in which C. Stonei, var. platytænium, is a parent, that and superbiens having been crossed by Mr. Seden. The hybrid possesses a good deal of the character of the precious form of C. Stonei, and differs from C. Morganæ in its broader petals. It was awarded a first-class certificate. C. Adrastus, a hybrid between C. Boxalli and C. Leeanum, received a similar award.

Lælia anceps.—The richness and variety of this beautiful species were abundantly displayed in a large group of plants exhibited this week by Sander & Co. Every plant was well flowered and every flower was perfect. There were probably 250 flowers altogether, on some sixty spikes, and they were all forms of what is collectively known as White Anceps. All the best varieties were included, and, in addition, two new ones, named Ashworthiana and Hollidayana. These are said to be from a new district in Mexico, Orizaba, and, whatever their source, they are of superior merit, the flowers being large, with broad segments. Ashworthiana was snow-white, with pencilings of mauve on the lateral lobes of the labellum. It was awarded a first-class certificate. Hollidayana was pure white, with a crimson blotch on the front lobe, and crimson lines on the side lobes of the labellum. One plant of the variety Sanderiana bore no less than sixty expanded flowers.

London. *W. Watson.*

New or Little-known Plants.

Pyrus Tschonoskii.

THIS interesting and handsome Japanese tree was first described by Maximowicz,* whose collector, Tschonoski, brought to him from the slopes of Fugi-san a single fruit and a portion of a leaf, now preserved in the herbarium of the Imperial Botanic Garden at St. Petersburg. Nothing more was seen of it until Mr. J. H. Veitch and I encountered in the woods near Nikko a single tree of a Pyrus, which, by subsequent comparison with Tschonoski's specimen, proved to have been this tree. It is evidently rare, for I only saw it in two other localities—in the grounds of a temple near Nekatsu-gawa, where there was a single specimen, and in the woods at the head of the Ysui-toge, near Kamizawa, at the base of the volcano Asama-gawa, in central Hondo, where there were two or three trees.

* *Mil. Biol.*, xii., 165 (1873).

Pyrus Tschonoskii (see figure on page 55 of this issue), which is a Pear-tree, rather than an Apple as described by Maximowicz, is, as we saw it, a tree thirty to forty feet in height, with a trunk about a foot in diameter covered with smooth pale bark, and a narrow round-topped head. The branchlets are stout, terete and marked with small oblong or circular orange-colored lenticels; during their first summer they are red-brown, rather lustrous, covered with loose pale tomentum, and encircled at the base by the conspicuous ring-like scars left by the falling of the inner scales of the winter-buds; later they grow darker, and sometimes nearly black. The winter-buds are ovate, obtuse, and rather less than a quarter of an inch long, and are covered with loosely imbricated chestnut-brown lustrous scales, tomentose above the middle and ciliate on the margins. The leaves are ovate, acuminate, unequally rounded or wedge-shaped at the base, and coarsely and unequally serrate with rigid glandular teeth, which are largest and most unequal above the middle of the leaf; they are thick and firm, dark green, lustrous and pilose on the upper surface, coated on the lower surface and on the petioles with thick pale, close tomentum, four to five inches long and two to three inches broad, with stout midribs impressed on the upper side, five or six pairs of conspicuous oblique veins running to the principal teeth and connected by reticulate cross veinlets; they are borne on slender terete petioles an inch and a half in length. The flowers are unknown. The fruit, which is usually solitary, or is sometimes in clusters of two or three, is obovate, pointed at the base and crowned with the thickened and partly immersed calyx-lobes, which are triangular, obtuse and covered with a thick coat of dense white tomentum; it is an inch long, two-thirds of an inch broad, of a dull yellow color, and rosy-red on one side, with a thick skin covered with pale lenticels, and austere coarse granular flesh. The seed is a quarter of an inch long, obliquely obovate, acute at the base and covered with a light red-brown shining coat. The fruit is borne on a stout rigid stem an inch to an inch and a half long and coated with pale loose tomentum, especially toward the much thickened apex.

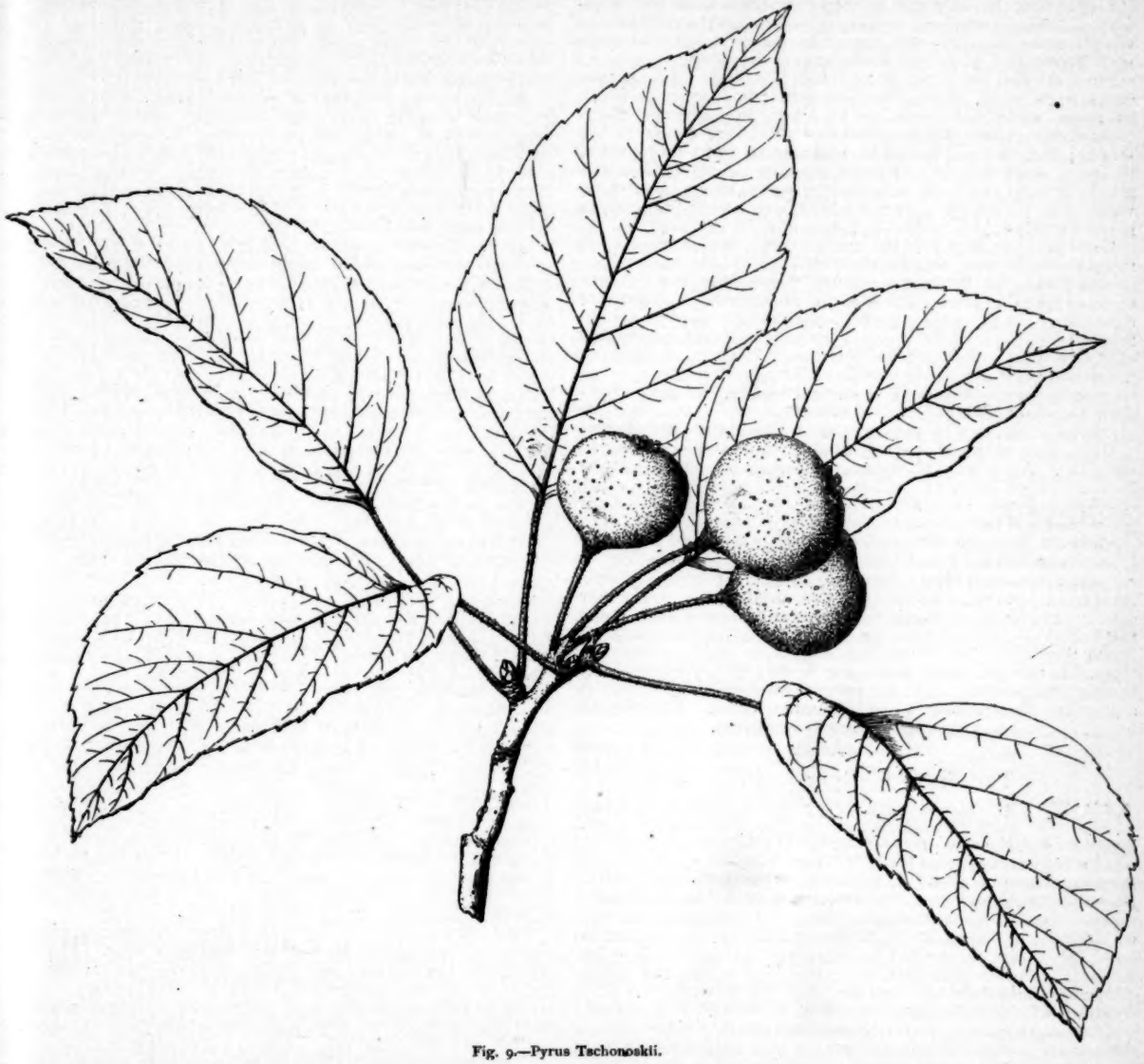

Fig. 9.—Pyrus Tschonoskii.

Pyrus Tschonoskii is the only indigenous Pear-tree which has been discovered in Japan, where the continental Pyrus Sinensis, a common cultivated fruit-tree in all parts of the empire, has occasionally become naturalized.

We were fortunate in securing a supply of the ripe seeds of this tree, which may be expected to prove hardy in the northern states. *C. S. S.*

Cultural Department.

Preservation of Soil Moisture by Tillage.

IN the January issue of that useful little quarterly, *The Strawberry Culturist*, Mr. J. H. Hale makes the following record of his experience as to the value of thorough cultivation as a means of stimulating the growth of Strawberries and other fruit-plants in a dry season.

In planting out about twenty-five acres of Strawberries last spring, we had exceedingly fine weather for the transplanting and one or two light rains after the plants were set out; then came nearly four months of extreme drought. Having no means for irrigation, the only way to keep the plants alive and stimulate a little growth, was constant cultivation; so, from one week's end to another, two horses and steel-frame cultivators were kept going, back and forth, among the rows; constantly stirring the soil in every field of berries, from two to four times each week. It came to be rather monotonous work, as there were no weeds to kill, and the average farm-hand does not see much sense in cultivation, except to kill weeds; but, as I was bound to encourage a growth of plants, the good work was kept up and the plants continued to make a light growth, while, in neighboring fields, where less cultivation was given, the plants made little or no growth, and, in many instances, on dry knolls, they withered and died.

Late in August favorable rains came, which continued through September, and the vigor which had been maintained in the plants by thorough culture throughout the drought enabled them to start off and make an enormous growth of runners, so as to mat the ground thickly with new plants before the coming of winter, and, I am satisfied, that the months of cultivation, which cost us, perhaps, three hundred dollars, has made us at least three million plants, and will enable us to supply our customers as usual next season and have abundant beds for fruiting.

Liberal manuring is an essential to successful Strawberry-culture, but constant stirring of the ground is even more essential. As noted this season, it is worth ten times its cost in seasons of drought, and at any time pays well, for the more completely the particles of earth are pulverized the more plant-food will become available for the plants.

The same practice will apply to all fruit-plants, and I noticed it particularly in the Peach orchards the present season; where the most thorough tillage had been given the trees suffered least from drought, and the fruit was of larger size and better quality than in the orchards where it was not possible to keep the cultivators at work after the growing fruit had so weighed down the limbs that it was impossible to work among the trees. In the cultivated lands the fruit kept on growing all through the season, but in the uncultivated orchards it was at a standstill for six weeks, until the rains came. This taught us the second lesson in the value of cultivation.

The Snow Creeper of India.

MR. WATSON'S note on page 35 of the issue of Garden and Forest for January 24th pleasantly renews my recollections of this lovely creeper. It is interesting to learn from such a high authority as Mr. C. B. Clarke that the specific name is racemosa. It is generally known in India as Porana paniculata, and Mr. Woodraw, lecturer on botany at Poona, whom I met at the Taj Mahal Gardens, called it P. volubilis, and had so named it in his book on *Gardening in India*. It is undoubtedly a plant that succeeds best in an exceedingly dry and hot climate. It grew and flowered fairly well in the Taj Mahal Gardens, where the soil is irrigated all through the dry season; but I found that it flourished far better at Rambagh, another Agra garden, where the only moisture it received was the annual twenty-five inches of rain that falls from June to September. There was a wall about fifty yards long by ten feet high, against which a number of plants had been planted, and the growth was so rampant that it had frequently to be thinned back to keep it within bounds. The wall was completely covered with the foliage, and during September and October it was draped with an unbroken mass of dazzling white panicles that hung like drooping folds of finely worked lace. People who are familiar with the large flaccid corollas of the Morning-glories and other Convolvulaceous plants that are common in gardens, would not, at first sight, be apt to class the minute-flowered Porana in its family group.

Like many other plants peculiar to dry districts, it is, no doubt, difficult to grow under artificial conditions as a stove-plant; but we are all so familiar with the wonderful adaptability of plants to seemingly unnatural conditions that I think it might be well worth a trial, care being taken not to over-water it from October to May. It stands well when cut for table decoration, it flowers with wonderful freeness, and is decidedly one of the most striking creepers that grow in the north-west provinces of India.

Manchester, Mass. *A. B. Westland.*

Seasonable Notes on Vegetables.

ALTHOUGH several weeks must elapse before anything in the way of planting or seed-sowing can be done in the vegetable garden, there is some preparatory work which ought not to be delayed until the rushing spring season. When the ground is frozen hard and clear of snow, manure may be wheeled on to the beds to advantage, for if this work is left until the frost breaks, the heavy nature of the ground will make hard wheeling, not to speak of the cutting up of roads and grounds which it will cause. Such work is really done best in autumn, at which time the ground should be manured and dug over, with the surface left rough, to enable the frost to penetrate more rapidly and pulverize it. A vegetable garden trenched, plowed or spaded in the fall, has a more presentable appearance than one covered with weeds and decayed vegetables, and it is better in every way than one left untouched until the advance of spring makes it necessary to do this work, and often to do it in too much of a hurry.

Comparatively few private establishments have structures specially set apart for growing vegetables, although, beyond question, such houses offer many advantages. Where this convenience is not available the hot-bed is a necessity, and no time should be lost in preparing one for early Lettuce. For a gentle as well as a lasting heat nothing is better than warm stable-manure and leaves in about equal proportions, thrown into a heap and turned over once or twice. At this season not less than three feet of fermenting material should be put into the beds, and it should be covered with a couple of barrow-loads of rotted manure and one of loam to each sash. Four or five days will suffice to warm through the mass, when the plants may be set out at the rate of forty to fifty to a sash. The beds should be ventilated freely every mild day and a small crevice should be left at each sash at night to allow the escape of any steam. A temperature of fifty degrees is high enough in the morning, and a greater degree of heat will inevitably cause the plants to damp off. Of course, the frames must be well matted and shuttered on cold nights. Of several hundred Lettuce-plants wintered here in cold-frames, from seed sown in September, the white-seeded Tennis Ball and Hittinger's Forcing have proved the most serviceable. In the Lettuce beds a sowing of Scarlet Turnip and French Breakfast Radish, which are quick-growing kinds, can be made.

Cauliflower and Cabbage plants, in cold-frames, must have abundant air at every available opportunity, and the sash should not be left covered with snow too long, as the plants will become blanched and spindling and will not be able to endure any freezing. Sowings can now be made in the cold-house of Jersey Wakefield Cabbage and of Snowball and Kronk's Erfurt Cauliflower. Sowing of Celery for early use is now seasonable, and I have found no better variety than the Golden Self-Blanching for this purpose. Parsley, which is wintered indoors or in a cold-frame, will run to seed as the season grows warmer, and a sowing may now be made in small pots to be transferred to a cold-frame or the open ground later on. Chappel's Matchless and Emerald are good kinds.

About the middle of February a few Cucumbers may be started for setting out in hot-beds a month later. The pots containing the seeds should be set in sharp bottom-heat and covered until they germinate. With the first rough leaf the plants should be transferred to three-inch pots, replunged in heat and shifted later into larger pots before the roots become bound. White Spine, Telegraph, and Tender and True are all good kinds for forcing, either in hot-beds or in a warm house. Sowing of the Early Edmand's Beet may now be made in boxes, and seedlings, if transplanted to a general hot-bed when they are large enough to handle, ensures an early crop. Plants pricked out in the open ground toward the end of April will be ready for use a month ahead of those sown out-of-doors. This is a good time, too, to make a sowing of Tomatoes, and when the plants are large enough to set out the weather will be sufficiently warm for them to fruit successfully in a Carnation-house or other cool structure, either in pots or in a bed. If properly trimmed they will interfere little with other plants in the house and will fruit freely until the fruit outdoors is ripe. Conference, a variety certificated by the Royal Horticultural Society of England, Sutton's Perfection

and Nicholson's Hybrid are all good varieties. Sutton's Perfection is handsome, and we shall plant it for future trial, but Nicholson's Hybrid sets its small fruit much more freely, and, so far, is the best variety we have ever tried for indoor cultivation.

Taunton, Mass. *W. N. Craig.*

Notes on Anthuriums.

THIS elegant family of stove decorative plants is a distinct class, and when seen in good condition, either as exhibition specimens or for home decoration, are always admired. Those of the Andreanum and Ferrierense types are remarkable for the brilliant colors of their spathes; while those of the Crystallinum Warocqueana and Grande types are distinguished for the rich coloring and massiveness of their foliage. Being natives of tropical America, they must be treated to genial warmth in this northern latitude. They can hardly be considered a difficult class of plants to grow; with a stove-house where a winter temperature of fifty-five to sixty degrees is maintained during cold weather at nights, and the usual rise of ten degrees or more by day, according to the amount of sunshine, any one may reasonably expect to succeed with them. The summer temperature, of course, will be considerably higher, approaching that of the tropics.

The Anthuriums, as a class, are quite particular about the material in which they are rooted, and they require a sweet, fresh compost which is not liable to become water-logged or sour. If, by any mischance, the compost gets in bad condition the roots of the plants are nearly always found dead, with only a few living ones near the surface of the pot. In potting Anthuriums, the compost which I have found most suitable is a mixture of fresh sphagnum moss and sun-dried cow-manure, such as can be found in a pasture. It should never be collected if not thoroughly dried, unless with the intention of drying it artificially for future use. To about three parts of sphagnum I add one of the dried cow-manure, with broken crock or small lumps of charcoal, to give it a porous character. This compost remains fresh and good longer than a general mixture of fibrous loam, peat and flaky leaf-mold, although I have used the latter to good advantage when the dried manure was not procurable. The purpose is to get a good coarse compost, one that the water will pass through without leaving the soil sodden and acid. Nothing of a fine texture, like ordinary potting soil or sifted leaf-mold, should be used.

In potting, ample shifts should always be given, for the plants root very freely and ramify in every direction. They are undoubtedly surface-rooting subjects in their native habitat, and subsist on the thin upper layer of such decaying matter as fallen leaves, mosses, etc.

Again, liquid-manure cannot be used with Anthuriums to any advantage, nor, indeed, any kind of fertilizers. Once they are pot-bound nothing seems to put vigor into them but repotting in fresh material, when they generally start off with good strength. Plenty of drainage should be used, and the surface of the compost should be built up above the rim of the pot some two or three inches and packed quite firm. They should always be kept moist in summer and winter. It is a mistake to subject them to any drying-off process, with the idea of giving them rest. This is detrimental, as the roots seem always active.

Anthuriums should be shaded when the sun is bright to save the foliage from burning or turning yellow and sickly. The leaves being large and soft, they are easily injured by the heat of the summer sun.

Old specimen pieces whose constitution has been weakened can easily be divided and potted up again, using one or more crowns to a pot, according to the discretion of the grower. January, February and March are good months for this work, as it allows the plants time to make nice pieces by autumn. After breaking up the pieces they must be kept a trifle warmer, if possible, in a moist atmosphere to excite root-action. This can also be done during the summer months, but not so successfully, because root-action is more vigorous at the beginning of the year, even in exotics of this class.

Many new seedlings, with spathes of striking color, have been produced within a few years, showing that a greater interest is being taken in these plants. Anthurium Andreanum and A. Ferrierense have held the lead quite easily, but new varieties are becoming common. Brownii is a rich dark variety; Albanense is claimed to be the finest colored seedling of the Andreanum and Ferrierense hybrids, and several English firms are offering new varieties.

Pittsfield, Mass. *A. P. Meredith.*

[At the exhibition held in Madison Square Garden in the spring of 1893 certificates were awarded to two seedlings exhibited by Mr. Meredith. The spathes were finely glazed and of a rich tint which might have been called dark blood color. One of them was shown under the name of Anthurium Cuttingianum, in compliment to Colonel Walter Cutting, of Pittsfield. We believe that it is not yet in commerce.—ED.]

Greenhouse Work.

THE busy period of spring potting and seed-sowing is rapidly approaching, and it is good practice at this time to get a quantity of soil ready for use, so that it may be in proper condition when it is wanted. Loam, leaf-mold and sand are the basis of our potting composts, with ground bone added for all such plants as are to remain in pots for a long period, as, for example, those that are potted annually. Hard-wooded plants do not like bone in the soil, and when potting Azaleas, Ericas, Boronias, greenhouse Rhododendrons and plants of like nature a separate compost is made up. It is a safe rule to follow, that plants of strong root-action need more loam and less leaf-mold, and vice versa.

Of the stock of Amaryllis all that are starting have been repotted, as also all the seedlings of the past year. Those that are still dormant are left until later, so as to provide a succession of bloom. The Amaryllis which are evergreen do not need so decided a period of rest as the deciduous varieties; this is the best time to repot these before root-growth commences.

Gloxinias have now started. The largest plants should be potted on, to be followed later by other plants as they require it. The worst enemy of the Gloxinia is thrips; where these get a footing all chance of bloom is lost, and the trouble is often unsuspected until too late to remedy it the same season. The white Orchid-thrips are the worst to get rid of. Continued fumigation sometimes proves a remedy, but this cannot be done after the flowers open, or some of them will be spoiled. We intend this season to dust the plants frequently with tobacco-powder during the earlier stages of growth.

In a few days we shall begin to pot all the warm-house plants. Crotons, Dracænas, Marantas and other foliage-plants will all be looked over, cleaned when this is necessary, and repotted. When this work in the warm-house is finished it will be time to begin to pot the plants in the cool-house. These are better potted on a month later, as growth does not begin as early as it does in the warmer house. Where Nepenthes are grown, and they have ceased to produce pitchers on the last-made leaves, the plants must be cut down to within an inch or two of the base. If less water is applied for a week or two, new growths will soon start, and these will develop their characteristic pitchers. If the soil is in poor condition the plants should be shaken out and potted in a compost of sphagnum-moss and fern-root. A mixture such as is used for Cypripediums is best for them. Cuttings of Nepenthes may be rooted in a brisk bottom-heat if they are taken off at this time and put in small pots, with moss and fern-root tied round the base of the cutting to keep it firm. From two to three months are usually required to establish the roots, and after this the plants grow rapidly.

Young Cyclamens from seed sown last fall should now be large enough to pot off into small pots. The smaller the pots, the better to start with, for Cyclamens are very impatient of overpotting at any season, and more especially at this time of year. The soil should be made porous, and plenty of sand must be added or a little powdered charcoal. Charcoal is always a desirable addition to potting-soil, or soil for seed-sowing, as it keeps it both sweet and loose. Old bulbs of Cyclamen when past flowering should not be dried off. This is sometimes done to the great injury of the bulbs for the next season's use. They may be placed under the benches, not altogether out of sight, and water must be supplied as long as the leaves remain. In spring a cold frame will suit them well. If leaf-mold is sifted over them so that the spaces between the pots are filled up, and about an inch of soil put over the bulbs themselves, little water will be needed, but in wet weather the sashes must be put on. By June some of the bulbs will have started, and these may be taken out and potted, and the remaining ones treated likewise as soon as they start to grow. We have had good success with old Cyclamen-plants under this treatment.

A very useful plant to have in small pots is Asparagus tenuissimus. This species roots easily from cuttings. It is a good time to put them in now, and they will be rooted in about six weeks. A. plumosus will not root from cuttings, but must be

obtained from seeds or layers. When the latter plan is adopted, care must be taken to let the end of the shoot remain out of the ground to continue growing; young plants will then start from each of the branches along the stem.

South Lancaster, Mass. *E. O. Orpet.*

Correspondence.

Misconception as to Forest-growth.

To the Editor of Garden and Forest:

Sir,—The last thing I should attempt to do would be to say a word in discouragement of honest efforts to arouse our people, and especially our farmers, to the importance of the art and science of forestry. It has been a subject of interest to me from boyhood, and all my life I have been planting trees. Nevertheless, I have thought that some writers upon forestry have a tendency toward extreme statement, which really may injure the cause they are trying to advance. One would think, from their statements, that a tree once cut down could never be replaced; or, at least, not for centuries. The impression is given that our forest-trees grow much more slowly than they really do, and also that second-growth trees are of very small account as timber.

Yet, while I am sure that the study of scientific forestry should be made an important part of the curriculum of every agricultural school, and should also have a conspicuous place in agricultural literature and journalism, I can but deprecate the impressions which are produced, to the effect that we are losing forever all our best timber, and that it cannot be reproduced at any moderate cost. The impression is often given that centuries are required to produce timber of any real value. Such a belief is far from true. Here, in the latest settled portions of Vermont, we can show, upon what were wheat-fields sixty years ago, as handsome Sugar-maples, trees as large and sound as those still standing in the untouched forest. And this is not alone true of the Sugar-maples. Good timber of other native varieties is being reproduced with noticeable rapidity. I have on my own farm Canoe Birches, sixty to seventy feet high, and a foot to eighteen inches diameter, straight and handsome, which cannot be more than forty to fifty years old.

My father, were he now alive, would be about ninety years old; and last year I was examining a considerable number of trees planted by him between 1828 and 1840. Among them are Horse-chestnuts sixty feet high, and from twenty to twenty-four inches in diameter six feet from the ground, together, with Maples and Elms, but slightly less in their dimensions. Trees set by myself, since the close of the war, are, in numerous instances, over a foot in diameter; and I have Butternuts, grown from seed, planted much later, which have been fruiting abundantly for six or seven years.

I was led to take up the subject just at this time by reading, in a bound volume of *The Vermont Farmer* for 1871, a report of a meeting of a farmers' club in Caledonia County, in this state, from which I make the following extracts to show the views held by practical tillers of the soil more than twenty years ago:

J. P. Foster said: "I would have all rocky places reset with trees. I planted Maples in Waterford twenty-five years ago that have been used for sugar-making for several years. Cedar (Arbor-vitæ) can be grown on rough upland that is dry and hard, with very little expense; it is becoming valuable."

John Bacon said: "What better legacy to leave to our children than fruit trees planted with our own hands? And what of forest-trees? One of my neighbors has now a good Sugar-bush on land once cleared, and the men are yet living who harvested from it a good crop of wheat. In New Hampshire I knew a piece of land when it grew a good crop of corn, which now carries forty cords of wood to the acre."

B. P. Brown said: "I came to what is now Passumpsic fifty-five years ago. I then planted two Maple-trees that are now nearly two feet in diameter. I would say, encourage your boys and girls to plant trees. I feel better for planting those trees."

O. G. Harvey: "I believe that forest-trees can be grown at a profit. White Pine on light soil, worth next to nothing for cultivation, could be planted at little expense, and in thirty years would be more valuable than the average tillage-land of our farms. Some fifty years ago my father sowed land to wheat which afterward grew to wood. Twenty years after we cut ten cords to the acre, leaving the best. It has been thinned twice since, and there are now twenty cords per acre upon it of good growing wood."

Andrew Warden: "Some two years ago, while passing over the road near the mouth of Ives' Brook, in Barnet, in company with Mr. James Ferguson, who is now over one hundred years old, he said: 'Andrew, I helped to reap wheat where those Pines stand, seventy-five years ago.' Now those Pines are two to three feet in diameter, and would cut from 40,000 to 50,000 feet of lumber to the acre."

I send you these notes to show that our New England farmers are not, and for many years have not been, indifferent to forestry matters. They need instruction in forestry, without doubt; but it is plain that they are by no means totally ignorant or indifferent as regards the great questions involved in the care of our forests. It may be said with truth that nearly all our best farmers are intelligently interested in a proper care and preservation and increase of our woodlands.

Newport, Vt. *T. H. Hoskins.*

Protecting Orange-groves from Frost.

To the Editor of Garden and Forest:

Sir,—On page 30 of issue of Garden and Forest for January 17th an account is given of the means employed to counteract the effect of the late "freeze" in southern California. Another method was used by my son on his ranches at Riverside. On Saturday night the thermometer fell to twenty-six degrees, and on Sunday night to twenty-eight degrees. He kept the water running through his groves throughout these nights. The temperature of the water when drawn from the flume was fifty-six degrees; when drawn off after flooding the ranches it was thirty-six degrees. Out of twenty oranges removed from the trees and tested, but two showed signs of having been touched by the frost.

Boston, Mass. *James C. White.*

Meetings of Societies.

The Western New York Horticultural Society.—II.

PRESERVATION OF FRUIT.

PROFESSOR CALDWELL, of Cornell University, began an address on this subject with a concise account of the chemical changes which go on in fruit to ripen it. These same agencies keep at work in the ripe fruit, and when it is already at its best the only change they can bring about is to make it poorer. Besides this, there are armies of living organisms which are ready to start decay wherever there is a weak or broken skin. These organisms, friends of the farmer or gardener in a great many instances, are enemies which he must fight all the time if he keeps his milk or fruit from spoiling. Concerning these bacteria, Dr. Caldwell went on to say:

Nothing is safe from them, for the dust of the air is charged with them; and they are always ready to begin work afresh whenever, as they are borne hither and thither by currents of air, they settle down on any dead vegetable or animal matter. Fruit, when separated from its vine or shrub or tree, becomes dead vegetable matter, and therefore is open to the attacks of these unfriendly bacteria.

In a museum, on a holiday, when a large number of people were moving about, the number of bacteria falling on a square foot in a minute was found by an English chemist to be 1,750. To satisfy my curiosity as to the number of these little people likely to be found on fruit as usually exposed, I asked one of my students to find out for me how many bacteria there were on an apple, about as big as my fist, which I took from a basket of the fruit that had recently been left in my cellar by the grocer. He reported 115,000; quite a good-sized city on a very small piece of land, one would say, and yet not much more thickly settled than a western prairie, since it would take 400,000,000 of these beings to cover one square inch of surface.

But they were there, nevertheless, ready for work whenever a place should be opened or weakened in the skin, where they might begin. Beset, then, as ripe fruit is from within so that it cannot grow better, but must grow poorer, if it changes at all, and beset with worse enemies from without, is it any wonder that the soft, ripe strawberry or blackberry or peach, or the mellow apple or pear, is hard to keep? There is but one really effectual and practicable way to meet this double evil tendency, and that is to heat the fruit to the temperature of boiling water; thus all power for evil of the ferments working within and of the bacteria without is permanently taken from them, and we have only to prevent exposure to air completely, so that no fresh bacteria-dust can come in contact with the fruit. This is the familiar process of canning fruit. Complete drying also stops the action of the ferments and bacteria

as effectually as heat; but really complete drying, leaving no moisture at all in the fruit, would yield a product so unlike the original fruit that it would have little value; and if the drying is not complete, as in the evaporated apple, we must resort to such means as cold storage to carry the fruit through the next warm season. The low temperature itself checks the tendency to decay, for ferments and bacteria do not work well in the cold, and the latter not at all at very low temperatures, but there is a limit at which the fruit is spoiled by the cold itself, and this, therefore, is but an imperfect means of preservation. Finally, there are certain chemical substances, like borax, boracic acid, salicylic acid, sulphurous acid, which act as poisons on bacteria; but as they can be applied to fresh fruits only in such a way that harm would come to those who eat them, their use is out of the question in such cases.

Therefore it is, that if we want to enjoy all the lusciousness of the ripe fruit, we must usually eat that fruit just when it is ripe; canned or dried it may be good still, but it is quite another thing; cold storage may preserve the lusciousness for a while, but not for long. Especially is this true of the berry fruits which have no protecting skin to defend them from the attacks of bacteria and consequent decay. The only way of preserving these tender fruits in a condition at all approaching that when they were picked is by canning, so that we are at least reminded of what they were when fresh, as they come upon our tables in winter. This is a perfectly wholesome way of preserving fruit, when honestly done; and an entirely successful way, so far as keeping the fruit in an eatable condition for an indefinite length of time is concerned. But there are temptations not to do it honestly, and the product dishonestly obtained may sometimes deserve severe condemnation.

The complete success of canning fruit, as to the mere matter of preserving it from molding and decay, requires that the contents of the can shall be heated throughout to a temperature at least nearly as high as boiling water; to do this takes time and care. If a little salicylic acid is added to the contents of the can it will assist the action of heat in killing all germs, and the heating need not be quite so thorough. But such an addition is not honest. The use of salicylic acid in wine has been prohibited in Europe, because, while small quantities added may do no harm, there is no guarantee that it may not be used to excess. It is not harmless when taken into the system. Fruit properly canned without it will keep perfectly; fruit improperly canned, or poor fruit canned in any way, may keep with its aid, and not without; and the more careless and slovenly the selection and preparation of the fruit, and the heating and sealing of it, the more freely must the preservative be added, to keep it from decay. Salicylic acid is widely used in this country in canning vegetables and tomatoes; probably it is also used in canning fruits.

Then we have two kinds of tin-plate—the "bright" and the "terne." The latter contains much more lead than the former. In Germany the law requires that tin-plate used for canning foods shall not contain over one per cent. of lead. In the chemical laboratory of the Department of Agriculture, at Washington, the tin of fifty cans, in which peas had been put up, was examined for lead; thirty of these were found to contain from one-half up to thirteen per cent. of this poisonous metal. Then, again, solder, rich in lead, is easier to handle than if poor in lead; in Germany, canners are prohibited from using solder with more than ten per cent. of lead in it. The solder of twenty-four cans, examined in the laboratory above mentioned, was found to contain from forty-three to sixty-five per cent. of lead. There is no question but that the use of lead, or of materials containing much lead, that are to come in contact with articles of food, and especially of acid food, is to be strongly condemned. It is possible that the poorer the quality of the materials coming in contact with alloys rich in lead, the greater the danger of getting some of the lead, and of the tin also, into the contents of the cans.

In respect to the drying of fruit, we have again a temptation to depart from scrupulous honesty in sulphuring to an excessive extent. Dr. Hilgard, Director of the California Experiment Station, does not believe in the bleaching, any way, and calls the handsome, light-colored slices of dried apple "whitened sepulchres." He believes that this sulphuring may be used to cover up dirty and damaged fruit, and that fruit excessively sulphured is less digestible, because it contains so much of this antiseptic; for all antiseptics, whether borax, salicylic acid or sulphites, are unfavorable to digestion when taken into the stomach, with the food. All fruit when dried in the air darkens, owing to the action of the oxygen of the air upon certain constituents of the fruit; and he thinks that this coloration "should be looked for by every consumer as the natural mark of an honest, unmanipulated article." In all this I am inclined to agree with him. At any rate, all honest men will agree that only clean and perfect fruit which needs no manipulations to cover up defects should be dried. All will agree that any manipulation which can cover up defects has its dangers, and that an extensive trade in any article may be seriously damaged by dishonest practice; and that in such cases many honest people suffer for the misdeeds of a very few rascals. Even carelessness may bring about the same result. Fruit dryers became careless in the use of the zinc trays in their evaporators, and zinc got into the dried fruit that went to Germany. It may and it may not be, that the German Government at that time wanted an excuse for putting some obstacle in the way of the importation of so much fruit, and pounced upon this occurrence of zinc in it as a pretext. But at any rate, if the zinc had not been there, the chances are that they would not have been able, on any other pretext, to hurt the trade so much as they did.

But the public has acquired a perverted taste, and demands the "whited sepulchres"; so till the public taste can be reformed, business must conform to it. But let this be done honestly, by using only the best material, and only just so much sulphuring as is necessary to bleach it to the desired point. Mr. Green, of the Ohio Experiment Station, states that some varieties of apples, such as the Fameuse, need no sulphuring in order to get a white evaporated product, and he would never use sulphur in the evaporator itself; he would merely expose the fruit to the fumes for a short time, when prepared for the drying—that is, he would use it, not to bleach out a dark color already formed, but to prevent any discoloration.

Concerning the preservation of fresh fruit, a rather singular method is proposed by Monclar, in a recent volume of the French *Journal d'Agriculture Pratique*. It consists simply in bedding the fruit in lime. He gives the following general statement of the results of his experiments:

(1) The lime does not in the least attack the skin of the fruit, even after prolonged contact. (2) The fruit does not dry any more in the lime than in the air. (3) No change takes place in the fruit other than such as is the natural consequence of its evolution.

This method was tested on oranges, artichokes, cherries, gooseberries, prunes, tomatoes, onions, potatoes, grapes, apples, pears, sugar-beets, and chestnuts with their shells removed. There was certainly no lack of variety in the material used. Not every test was successful. Tomatoes kept well for two weeks, and half of them for nearly five weeks. In another trial, tomatoes picked before fully ripe, in order to save them from an early frost, and put in lime on October 22d, were good till January 15th. Pears, of a variety that he had been unable to keep beyond December in any other way, kept well in lime till the middle of April. The most interesting results, and it seems to me the most striking, were obtained with grapes. Three varieties were packed in lime on September 13th; the first examination of them was made December 22d, when all were in good condition; April 15th two bunches of one variety were taken out, one of which was fairly well preserved, the other very well; all of one of the other varieties were in a bad condition and were removed. On May 2d the box was emptied, and all of those still remaining were in excellent condition. In another trial made in the preceding year, the last bunch of grapes in the box was taken out July 1st, when half of the berries were well preserved and had an exquisite flavor.

MR. HALE'S ADDRESS.

Mr. J. H. Hale, of Connecticut, furnished a good many practical suggestions on various subjects connected with horticulture. He believes that the tendency to grow cheap products and to slight horticultural work is due to some extent to cheap nursery stock. Men usually give attention to trees in proportion to their estimated value, and one which costs a cent is of less account to a planter than another which costs five times as much. Nurserymen ought to charge enough for their stock to pay a reasonable profit and to make their stock better than much which is now sold. Among the lessons which Mr. Hale has learned last year were: (1) that frequent surface cultivation is the best security against the injurious effects of drought and poorly cultivated orchards; (2) that workingmen, and what are known as the middle classes, rather than the wealthy, are the best patrons of the fruit-grower; and (3) that fruit should be widely distributed in local markets for the best commercial returns. He condemned ventilated crates for berry-fruits, and says that such fruits always keep longest when picked dry and cool, and then packed in very tight crates. This view was confirmed by the chemists at the meeting, who stated that in the process of decay fruit uses oxygen and gives off carbonic acid gas, and if the air, with its oxygen, is excluded the ripening will be checked. This view was also

corroborated by the experience of Mr. George T. Powell in his berry shipments to the World's Fair. Mr. Hale argues that more intelligent care should be devoted to the cultivation of apples. It is the opinion of good judges that apples are too much neglected and that new orchards are not being planted with sufficient rapidity to take the places of old ones and keep pace with the increasing demands. Apples are coming to be less common, even in northern markets, than oranges.

The sum of the discussions about spraying was that it cannot be relied upon as a complete remedy for the curculio in stone-fruits; that the Vermorel nozzles are the best for general purposes; that the Bordeaux mixture of half the strength of the original formula is the best general fungicide. The experiments of Professor Beach in preventing the cracking of Seckel and White Doyenne pears, Mr. Waite's success in annihilating Pear-leaf blight, and Mr. Lodeman's experiments in checking the apple-scab on fruit and foliage, were noted as the leading recent achievements in the spraying of orchards.

Notes.

Fifteen million spools were made last year by a single company in Michigan.

The *Rural New Yorker* commends Nott's Excelsior Pea as the best of the dwarf varieties. The plants grow twenty inches tall, with abundant and vigorous foliage, and they are more prolific than American Wonder or Little Gem, being as early as the first-named variety and of the same quality.

The delicate little sweet-scented flowers of Chionanthus fragrans are already open out-of-doors in latitudes south of Philadelphia. As its specific name shows, the flowers of this shrub are noted for the penetrating and yet delicate quality of its perfume. A few sprays of it will scent the air of a large room.

A correspondent of *Science* writes that there is a variety of Nymphæa odorata growing in a mill-pond at Hyannis Port, Massachusetts, which is an exact copy of the type, except that it is in miniature. Flowers of this little Water-lily are only half an inch in diameter, and the leaves, while they are perfect in shape, color and venation, are only an inch and a half across.

Not long ago we noted the fact that Coe's Late Red plums, from California, in fair condition, were selling at midwinter on the fruit-stands in this city. We now learn from the *Grocers' Review*, of London, that these plums were on sale during the holiday season in Glasgow, having been shipped thither from New York, where they caused much favorable comment on account of their freshness, beauty and flavor.

In last week's issue, in an account of Professor Beach's experiments quoted on page 49, the removal of a decimal point one place to the left divided by ten the increased value of the fruit on Pear-trees that were sprayed for scab over those that were not treated. This means that the gain in the value of the marketed fruit to every hundred trees, over all expenses, was $423, instead of $42, in one case, and $562, instead of $56, in the other.

An English horticultural journal speaks in high praise of Linum flavum as a plant for winter bloom in the cool-house. Some of these plants in flower in the show-house of the Birmingham Botanical Gardens are said to be very effective among Bouvardias, Cyclamens, Cinerarias and other plants. It may be added that this is one of the very best of winter-flowering plants for window-culture, as it requires little special care and furnishes flowers of a beautiful yellow, a color which is highly appreciated at this season.

Under the name of Gyrophora esculenta, the edible Lichen of Japan, known as Iwatake, is described in the *Botanisches Centralblatt*. The commercial value of this Lichen is due to the great amount of starch and some gelatinous substance which it contains, which give it a value in cookery. It is extensively used in Japan as a condiment, as it has a pleasant flavor. In some parts of the island, especially in the mountain districts, it completely covers the moist granite rocks. It is dried and sold in this state in the towns, and large quantities are annually exported.

A Chicago correspondent of the *American Florist* speaks in high terms of the pink Carnation, Madame Diaz Albertini. The flowers have a rather deeper color than those of Daybreak; they are very large and double, of perfect shape, and have no tendency to burst the calyx. The stems are very strong, which is an important point when we consider the extra weight of the flower. Mr. J. T. Anthony considers this one of the very best varieties for those who sell flowers of extra quality, for although the plant does not bear so abundantly as some other pink varieties, as, for example, William Scott and Mrs. Elizabeth Reynolds, they always bring high prices and command $1.00 a dozen when the commoner sorts sell for fifty cents. The flower is specially fragrant.

The *Saw-mill Gazette* gives the following illustration of the amount of timber which is wasted in sawdust, a waste which seems slight when one observes the cutting of a few logs into plank, but which amounts to an immense loss when we consider the number of mills at work all over the country. If a fourteen-inch log is to be converted into boards five-eighths of an inch thick, twenty boards can be sawed from the log, if the saw cuts but one-sixteenth of an inch between each plank. Eighteen boards can be made if one-eighth of an inch is sawed away, and if three-sixteenths are lost, only seventeen boards will be obtained. That is, the loss in the first case is nine per cent., in the second seventeen per cent., and in the third twenty-three per cent. of the timber. If the log is twelve feet long the waste in sawdust will range from one and one-half cubic feet to nearly four cubic feet, and a single saw-frame, which cuts up fifty logs a day and works 250 days in a year, would convert from 20,000 to nearly 50,000 cubic feet of timber into sawdust every year. This large amount at twenty-five cents a cubic foot, which is a fair average for pine, will represent in money $12,287. Thin saw-blades, with carefully sharpened teeth, are therefore great factors in saving material, and every year the need for such saving is becoming more urgent.

During the festivities which precede the Lenten season there has been a brisk demand here for flowers of good quality. Among roses, Meteors, Catherine Mermets, Brides and Bridesmaids, with long stems and luxuriant foliage, are worth six dollars a dozen, and American Beauties have sold from fifty cents to a dollar and a half each for exceptionally well-grown flowers. Although there is a temporary scarcity of violets, they have been so abundant until the past few days that the price has fallen. Beautiful and fragrant sprays of orange-blossoms are for sale in several of the stores, not only for use at wedding ceremonies, but to meet the demand of residents from the south, who hold them in regard for association's sake. The supply is irregular, and the price uncertain, a bunch of four or five small sprays now commanding two dollars. Roman hyacinths are beginning to be replaced by the flowers of the Dutch hyacinths, and pink tulips are in special favor. The carnation, Storm King, still sells here at the highest price. The new striped variety, Helen Keller, which seems to have made a furore in some other cities, has not proved so captivating here, and sells at the price of other good carnations, seventy-five cents a dozen. Among the shrubs which have been forced into flower, Deutzia gracilis is by far the most abundant, and a bunch of a few small sprays brings seventy-five cents. Jonquils are worth a dollar a dozen, and beautiful freesias cost only fifty cents for twenty-five sprays.

Among the foreign vegetables in our markets now is cabbage from Denmark, which sells wholesale for ten dollars a hundred heads. These heads are much more firm and heavy than any home-grown cabbage, although the native product is said to be sweeter. Beautiful new potatoes have been coming from Havana for a week and bring six dollars a barrel; old potatoes from Bermuda bring the same price. Scotch magnums still sell at higher prices than our native potatoes, being of larger size, more regular in form and more evenly selected. They are considered better than the potatoes from either England or Ireland, but not so good as those from Germany. At present prices, which are one-third less than they were last year, after the cost of sacking, transportation and duty is deducted, the returns to the Scotch dealer can be hardly more than fifty cents a barrel. Last month 40,000 sacks of these potatoes arrived, but the market is so dull that many of them are still kept in storage. From France we are receiving Brussels sprouts at twenty-five cents a pound, and cauliflower at forty to fifty cents a head. Corn salad, chives and escarole from the south, make the markets green. Florida is sending peppers, egg-plants, okra, beans and peas, the last of which command as much as eight to nine dollars a bushel crate when of the first quality. A few bunches of Charleston asparagus, the first to arrive here this season, sold last week at a dollar and a half a bunch, but the quality scarcely warranted this extreme price. Apples still remain scarce, although they are held in considerable quantity in the interior of the state. Northern Spies, Baldwin and Greenings bring six dollars a barrel, while it is hard to get Kings even at eight dollars a barrel.